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A BEEKEEPING VISIT TO THE SOVIET UNION

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INTRODUCTION

In 1932 Professor and Mrs. E. F. Phillips, from Cornell University in the United States, spent a month in Russia visiting various beekeeping and bee research establishments (Fig. 6). The reorganization of the Soviet Union since the Revolution has proceeded for twice as long again since Professor Phillip's visit; yet as far as I know, there has been no ' bee visit ' to the country from the western world during these thirty years. I was therefore very pleased to have the opportunity last year to visit the Soviet Union, and to meet some of the bee research workers and beekeepers.

Whereas the United States of America (U.S.A.) form a federal republic of fifty states, the Union of Soviet Socialist Republics (U.S.S.R.) is a federal state of fifteen ' equal and independent ' republics. The largest of these republics is Russia*, more correctly known as the R.S.F.S.R. (Russian Soviet Federal Socialist Republic), which occupies three-quarters of the Soviet Union and includes the whole of Siberia, and not only Moscow, but also Leningrad and Vladivostok, 5000 miles apart. In size, it is something like a super-Texas, as large as Texans would like to believe Texas is, and extending to Washington, New York and San Francisco. To the west of it is the ' equal and independent ' republic of Belorussia (White Russia), and to the north-west are three more, Lithuania, Latvia and Estonia. Still in Europe, to the south of the R.S.F.S.R. are the Ukraine and Moldavia; south of the Caucasus, in Asia, are Georgia, Azerbaijan and Armenia. The remaining five republics are also in Asia; Kazakhstan is south of Siberia, and to the south again, going from west to east, are Turkmenistan, Uzbekistan, Tadzhikistan and Kirghizstan. Within these ' equal and independent ' Union republics are various ' autonomous ' republics such as Bashkir in R.S.F.S.R., and Abkhazia in Georgia.

It has been possible to check some of the information collected during my visit with Mr. N. M. Glushkov, Director of the Beekeeping Research Institute, when he was in England in the spring of 1963. Mr. Glushkov has himself written articles on Soviet beekeeping and bee research[3,4], and information in them is not in general repeated here. I have, however, included various personal impressions. I realize that some of these might be modified on another occasion; but on a first visit they were chiefly noteworthy for their variety — admiration, amazement, bewilderment, and sometimes frustration, following each other in quick succession. Above all, there was the continuous interest of a glimpse into a different world — often seeming to me like Alice's world *Through the Looking Glass* — peopled not by a homogeneous body referred to in the press as ' the Russians ', but by individuals almost as diverse as those in Alice's looking-glass world.

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* The names Russia and America are commonly used for the Soviet Union and the United States of America respectively, in spite of the fact that Russia is only one republic of the Soviet Union, and the U.S. only one country in America.

THE CONGRESS IN MOSCOW

The occasion of my visit was the Third International Beekeeping Congress of Socialist Countries, held in Moscow in September 1962. The first two of these Congresses, held in Prague and Warsaw respectively, had been in principle meetings between scientists of the socialist countries to discuss their research work. The meeting in Moscow was differently oriented, and its chief aims seemed to be to acquaint Russian beekeepers and bee scientists with the status of beekeeping and bee research in the socialist countries, and to present and co-ordinate plans for future collaboration between the national efforts.

Delegates

In the communist world a man or woman has far more authority and effectiveness as a *delegate or delegation* than as an *individual person*, and the significance of the office as opposed to the person was one of the many lessons I found hard to assimilate.

There were two delegates at the Congress from each country represented :

Bulgaria	Prof. A. Lazarov	Chief, Dept. Entomology and Apiculture, Higher Agricultural Institute, Sofia
	V. Petkov	Senior research worker, Beekeeping Experimental Station, Sofia
Czechoslovakia	Dr. J. Svoboda	Director, Bee Research Institute, Dol. p. Libčice
	V. Veselý	Scientist, Bee Research Institute, Dol. p. Libčice
D.D.R.	Dr. H. Oschmann	Director, Beekeeping Institute, Tälermühle
	H. Westphal	Bee Scientist, Ministry of Agriculture, E. Berlin
Hungary	Prof. Z. Örösi-Pál	Chief, Dept. Apiculture, Research Institute of Small Animal Breeding, Gödöllő
	Z. Faluba	Chief bee master, State Farm Gadom, Leonefalu
Poland	Dr. L. Bornus	Chief, Bee Department, Institute of Pomology, Skierniewice
	A. Belinski	Bee Scientist, Ministry of Agriculture, Warsaw
Rumania	I. Barac	Director, Experimental Station of Apiculture and Sericulture, Bucharest
	V. Alexandru	Scientist, Ministry of Agriculture, Bucharest
U.S.S.R.	N. M. Glushkov	Director, Beekeeping Research Institute, Rybnoe, Ryazan Province
	Vera Kondratieva	Bee Scientist, Ministry of Agriculture, Moscow

Delegates from the People's Republic of China and North Vietnam were absent, and those from Cuba arrived too late to attend the Congress.

In addition to these delegates, two guests from the capitalist world were invited: Dr. J. Louveaux from France, and myself. We were accorded all the privileges of delegates, but without any of the responsibilities, and we were both most grateful to the Soviet authorities for their generosity in inviting us to take part in the Congress. It was indeed generosity, for all our expenses in the Soviet Union were paid by the Soviet Ministry of Agriculture.

Papers read

The Congress meetings (Fig. 3) were held on September 10, 11 and 12, in the ' mornings ' before lunch (10 a.m. to 3 p.m.). The Congress was opened by Mr. K. Navarenko, the Soviet Deputy Ministry of Agriculture, and between the opening ceremony and the formal closing session on the

last day, the delegates — and some others from the U.S.S.R. — read papers, as follows :

U.S.S.R.
A. M. Kovalev: Economic improvements in the use of bees for pollination
S. V. Zhdanov: Value of bee breeding
N. M. Glushkov: Development and future of scientific bee work in socialist countries
A. Mel'nichenko: Future plans for improving bee forage
G. A. Avetisyan: Future plans for bee breeding and beekeeping
V. Poltev: Perspectives in the fight against bee diseases
G. F. Taranov: Current problems in breeding and keeping bees
Bulgaria
A. Lazarov & V. Petkov: Achievements of science and outstanding beekeepers in the Bulgarian People's Republic
Czechoslovakia
J. Svoboda: General survey of beekeeping work in Czechoslovakia
V. Veselý: Instrumental insemination of queen honeybees
D.D.R.
H. Oschmann: Beekeeping and scientific work in the German Democratic Republic
Hungary
Z. Orösi-Pál: New work in queen rearing
Poland
L. Bornus & A. Belinski: Achievements of science and practice in the field of beekeeping in the Polish People's Republic
Rumania
I. Barac: Organization of scientific research work on beekeeping in the Rumanian People's Republic
V. Alexandru: Scientific investigation in the service of beekeeping production

There seems to be a strong and growing desire in Moscow to fit all the countries of the socialist bloc into the same uniform pattern of beekeeping and bee research, as of other activities. All except two of the papers served either towards this end, or as progress reports on achievements so far. Their aim appeared to be to instruct the audience, and to provide a social stimulus to economic progress on similar lines in all countries concerned. The ' capitalist ' concept of the presentation of results of recent or current research work, with the idea of stimulating discussion between individual scientists working in the same fields, was entirely absent. Indeed, papers were not followed by discussions at all, a paper read by one individual to a passive audience being itself referred to as a discussion.

At the final meeting of the Congress a series of resolutions was presented, and passed with acclamation. Being a guest rather than a delegate, I had no part in formulating them, and I do not know how this was done, nor by what means unanimity was achieved; there was no indication of an appended minority report.

Paragraphs 2 and 5 read as follows, and others are in a similar vein :

> 2. The Congress notes that the whole range of political, economic and cultural problems facing the socialist countries can provide great possibilities for the conditions of scientific investigations, and for the collective direction of the future development of beekeeping.
>
> 5. The Congress recommends that the plans for 1963-65 in the various countries be made with foresight, using the strength and resources and scientific personnel more rationally, aiming at the most thorough investigation in each country, so as to secure the rapid solution of the basic problems facing beekeeping in all socialist countries.

Dr. Louveaux and I, the 'capitalist' guests, were courteously invited to add our names as subscribers to the resolutions. Since our own countries do not form part of the socialist bloc, it would be impossible to implement such an agreement, and with our hosts' approval we appended a separate joint statement instead:

> The representatives of France and Britain agree in principle to associate their work with that of their colleagues meeting in Moscow on 10–12 September 1962, by the exchange of scientific and technical information on bee research.

Other contacts

Among the many people I was interested to meet at the Congress were V. V. Alpatov, L. I. Perepelova (Fig. 6), S. V. Zhdanov, and V. A. Gubin, whose father and grandfather were also well-known beekeepers. I was pleased to renew my acquaintance with others, including G. F. Taranov, V. I. Poltev, G. A. Avetisyan, and I. A. Khalifman, who is on the editorial staff of *Agrobiologiya* but is more widely known as a prolific writer of bee books (Fig. 3).

I also met beekeepers and scientists from the whole span of the Soviet Union from the Baltic to the Pacific. This personal contact with the beekeeping of such a vast and varied territory was a stimulating experience, reminding me forcibly of the first occasion on which I had heard first-hand accounts of beekeeping in the Far West of the U.S.A. This was during my first visit to the country in 1953; the new horizons opened up made me determined one day to travel across to the Pacific coast, and this I was able to do in 1957. In Moscow I became just as eager to travel across Siberia and the Republics to the south, until I reached the Pacific coast from the west, to see these honey-producing lands (see page 57). But I realize that the accomplishment of this depends less on my own determination than on the easing of existing travel restrictions: travel in the Soviet Union is not simply a question of buying a round air ticket, and staying at beekeepers' houses along the route.

There were altogether several hundred Russian beekeepers and scientists at the meetings. Many had brought gifts with them to Moscow—samples, so to speak, of the homelands they so clearly loved. From wild and wooded Bashkir I received a pot of honey supported by a wooden Bashkir bear; from Alma-Ata in Kazakhstan there came enormous Aport apples, and from Kazan on the Volga reproductions of Shishkin's paintings of log-hive apiaries in the forest. I was greatly touched by these gestures, for they were so individual and spontaneous. And there were always gifts of flowers — usually home-grown — and of brooches portraying the Kremlin or the dove of peace.

Exhibition of Economic Achievement

The Congress meetings were held in the Water Engineering Pavilion of the Exhibition of Economic Achievement, and one item on the programme was a visit to the Exhibition itself. For organized visitors to Moscow (and very few indeed are unorganized), such a visit is a 'must' in a physical and literal sense never implied in the American use of the term. The programme for the visit is laid down beforehand, and is immutable. Only a fraction of the 76 pavilions can, of course, be visited on one day, for the Exhibition is enormous, covering 534 acres. Near the massive entrance arch is a famous steel statue 'Worker and collective-

farm woman'. Many of the pavilions inside are in what is known as the Stalinist style, roughly equivalent to our Victoria and Albert. The centrepiece is a circular fountain, decorated with fifteen life-size gilded female figures, representing the fifteen independent republics of the Soviet Union (Fig. 4). When I saw this fountain, from a platform near the Cosmonautical Pavilion, my first thought was how much Queen Victoria would have appreciated it all. At the 1851 International Exhibition in Hyde Park, the 13 937 exhibitors, plus an average of 40 000 visitors each day, were crowded into a site of twenty acres. Here there was room and to spare, and both concept and execution of the Exhibition would have won Queen Victoria's approval. The far-flung corners of the Soviet territories are here symbolically gathered together, and few Russian visitors can leave the Exhibition without feeling that they are members of a great and expanding country. Expanding it certainly is, and it is perhaps partly for this reason that I saw so many similarities to Victorian England in present-day Soviet Russia. At home I knew the Industrial Revolution only as an historical fact, but here it was taking place before my eyes, and this exhibition was an epitome of it.

Whereas the Exhibition grounds are so spacious that they seem to have been laid out for a race of giants, the pavilions themselves—as in the 1851 Exhibition in London — are crowded with instructional matter and exhibits. Pictures and charts — with texts from Lenin, Marx and Krushchev as fillers — cover the walls from floor to high ceiling. A parallel can be seen in Russian church decoration, where frescoes cover windowless walls and pillars, up to the roof. After all, both serve similar purposes of instruction and exhortation.

The pavilion in which I was especially interested was, of course, that devoted to beekeeping (Figs. 1, 2). It is noteworthy that there is such a pavilion, and although it is much smaller than those devoted to space travel, radio communication or agricultural machinery, its size and execution are something that beekeepers in other countries can only admire and envy. The area devoted to beekeeping is perhaps two acres; outside the pavilion itself are large demonstration apiaries, plots of bee plants, and a smaller building in which classes are held, where we spent a pleasant half-hour tasting honeys. An enormous range of them is produced in the Soviet Union; this is not surprising since it covers an area as great as the U.S.A., Canada and western Europe together. The honeys I remember especially were from sunflower, raspberry and buckwheat, and a lime honey tasting quite different from ours, from *Tilia parvifolia.*

The pavilion (Fig. 1) consists of a central hall perhaps 75 feet long, flanked by verandah-type wings where hives, foundation making, honey extraction and beeswax processing are demonstrated. The hall is full of exhibits and information, to interest the public in beekeeping, to make them realize the value of bees for pollination, and to tell them about the achievements of Soviet beekeeping. It is in the charge of Mrs. A. F. Bikova, who has three or four girls to act as guides. The whole staff is so enthusiastic that they must play a significant part in stimulating and maintaining an informed interest in bees and beekeeping among the Soviet public. A visitor with half a day to spare, and with one of these guides at his side, would get a good understanding of the various facets of beekeeping in the fifteen republics of the Union. Our programme had, alas, allocated most of the time available to visiting other pavilions, and when we finally

got to Beekeeping it was almost too late even to take photographs. I was especially disappointed, because I had hoped to get full details to pass on to beekeeping organizations in other countries.

The extent of beekeeping

Official sources give the present number of colonies of honeybees in the Soviet Union as 10·6 million. Their ownership and yields are probably something like this :

	on state farms (*sovkhoz*)	on collective farms (*kolkhoz*)	in private ownership	total
No. colonies	5 500 000		5 100 000	10 600 000
No. beekeepers	60 000		540 000	600 000
Average no. colonies run by one beekeeper ..	90	70	10	
Average honey yield per hive in kg. [2·2 lb.]				
total*	35–40	30–35	30	30–32
left for winter	20	20	20	20
beekeeper's surplus*	15–20	10–15	10	10–12

* See also page 56 under ' Honey yields '.

At the beginning of the first five-year plan in 1928 there were over twenty million peasant farms, with an average crop area of 4½ hectares [11 acres]; these are now almost entirely replaced by *kolkhoz* and *sovkhoz*, of which there are about 98 000 altogether. The *sovkhoz* are owned and run directly by the State and seem to give higher yields and to present fewer difficulties altogether than the *kolkhoz*; these collective farms are run on a co-operative basis under rather close State and Party supervision, and are gradually being combined into larger units in an attempt to increase efficiency. The small privately owned farm of the capitalist countries (referred to as ' petty ' farming) hardly exists any more in the Soviet Union. Since 60 000 professional beekeepers are distributed between 98 000 collective and state farms, nearly 60% of the farms must have apiaries; some farms presumably have more than a single beekeepers' quota of 70–90 hives. The Beekeeping Institute and other official bodies are continually exhorting farms to pay more attention to beekeeping.

Beekeepers

Most of the Russian beekeeping books are written for, and about, these 60 000 beekeepers on the collective and state farms (Fig. 11). These are the beekeepers through whom progress in beekeeping can be officially directed; they are discussed further on page 56. But I should like to put on record the fact that they constitute only a tenth of the total number, 90% being spare-time beekeepers. A few of the latter are town dwellers who keep a few colonies on their balcony, or at their own or a friend's *dacha*. The majority are farm workers, who keep bees on their own allotments, or wherever they can find a site. Reasonably enough, a professional beekeeper may not keep his own bees in the apiary he is employed to look after.

Retirement pensions are half the wages or salary at retirement, and some pensioners keep bees to augment their income; for these, as for retired people in capitalist countries, beekeeping can develop into a full-time occupation. There are no beekeepers' associations, as we understand the term, to bring these amateur beekeepers together, but there is a vast network of educational programmes, so they meet each other at evening classes, and doubtless also at the markets (page 57). The excellent bee-keeping journal *Pchelvodstvo* must be a real and important link between them; the current issue has a published circulation of 200 000.

I was told that the common ' capitalist ' picture of the Soviet Union as a country where men and women do the same work, however heavy its physical demands, is untrue. Beekeeping involves heavier work than say tractor driving or street cleaning (which women do), and not more than 20% of the professional beekeepers are women; an additional factor is that beekeeping often involves work at a distance from the farm workers' houses, and is therefore impossible for women with young children to look after. Among the amateur beekeepers the proportion of women is no higher — for the very human and non-political reason that the menfolk are glad of an excuse to go out in the evening, while their wives get on with the housework !

The outstanding impression from all the people I met was one of enthusiasm; scientists and beekeepers alike appear as devoted to their bees as their most enthusiastic western counterparts do. It struck me once again, as it has in other countries, how this curious passion for a small insect can transcend barriers of politics, race and language, and bring strangers together as friends.

Types of hives

According to official records, fixed-comb log hives were eliminated by 1940. All hives are free-standing (not kept in bee-houses) and are worked from above. There are several standard types, whose use seems to be based on tradition in different regions, and on the inclination of the beekeeper, as in other countries. One type, used especially in the Ukraine, is long, with 24 standard brood frames 43·5 × 30·0 cm. [17·1 × 11·8 in.]. Honey is stored at one end, and supers with half-depth frames are sometimes used also. All other hives have honey supers at the top, and all except one take frames of the sizes mentioned above. The complete brood-frame area (one side) is 1305 sq. cm. [202 sq. in.], similar to the Dadant (199 sq. in.), and the honey frame is half as large; alternatively full-depth frames are used. Brood chambers take 12 frames, or 14 in one type; they may be single- or double-walled. The one exception, used especially in the Far East, is more like a Langstroth hive in size. Brood chambers and supers are identical, taking ten frames 43·5 × 23·0 cm. [17·1 × 9·0 in.], with an area of 1000 sq. cm. [155 sq. in.]; Langstroth brood frames are $17\frac{5}{8} \times 9\frac{1}{8}$ in.

Frame spacing (centre to centre) is 1·5 in. in the brood chamber and 2·0 in. in the supers. Foundation is made with several cell-sizes; the standard width is 5·37 mm., in Bashkir and Siberia it is 5·70 mm., and for bees reared in large cells (see page 60) 6·00 cm.; such bees are 16% heavier than those reared in normal cells.

In general, therefore, a large brood chamber has been adopted as standard. Professor Phillips[5] regarded this choice as a mistake: ' Because

of the great diversity of conditions to be found in the Soviet Union, and because of the far greater difficulty in making colonies in such hives [as large as our Jumbo] strong and profitable, it seems a pity that they have made this selection. . . . I was compelled to tell the head man in beekeeping [Kosatkin] that if I were responsible for the success of their large plan [in the Second Five Year Plan (1932–1937) the number of colonies was to be increased from 5 million to 40 million], I would scrap all the frames that they now have, cut down the hives to about Langstroth depth and cut the loss, for the sake of better and safer results later on.' There seems now to be a move towards extending the use of the last hive mentioned above, which has a smaller brood chamber.

Apiary management

Professor Phillips[5], describing Soviet beekeeping developments in the first fifteen years after the Revolution, said: ' The reason for the proposed expansion of beekeeping lies not so much in the desire for larger honey crops, but is based on the benefits of honeybees in pollination. Under older methods of agriculture, the plots for growing each plant were small, and fields were separated by high mud walls which offered abundant nesting and hibernating places for wild insects; there was no urgent pollination problem. Under the new plan of agriculture, the old mud walls are eliminated, and vast fields are being planted to single crops, making it almost impossible for enough wild species of insects to find places to live. This makes it imperative that pollinating agents be provided artificially. The productivity of their seed crops, except the grains, and in turn their whole plan of agriculture, depends on the success in providing honeybees for pollination.'

The bees on collective and state farms are thus kept there to ensure adequate pollination of insect-pollinated crops. Naturally they are also run for honey production — and as a matter of course also for wax production. The Soviet Union aims to be self-sufficient in beeswax, so every farm apiary must contribute enough wax for its own requirements in foundation, plus a surplus. Apiary management is therefore not quite the same as in countries which find it more profitable to produce honey only (keeping wax production to a minimum) and to import beeswax from countries which can produce it well and cheaply. Wax secretion is encouraged at the stage of colony development when comparatively little extra food is needed for wax making: this is known as ' spontaneous wax production '.

There is a certain amount of migratory beekeeping, but it is severely limited by the insufficiency of good roads, and of vehicles. Hives and other equipment appear to be more cumbersome and time-consuming than ours; wood is so plentiful that it is used liberally, with consequent increase in weight, and in the number of parts to be moved in any beekeeping operation. It seems fairly common to remove combs singly for honey extraction, and to extract honey and feed it back for winter stores. There are few mechanical aids by English standards, let alone American. The handling of colonies does not seem to be governed by any desire or necessity for speed. In general the efficiency of professional beekeeping, measured in terms of the number of colonies a beekeeper can look after, is low in the Soviet Union compared with the more progressive capitalist countries.

For instance a beekeeper in the U.S.S.R. manages 70–90 colonies, in England 250, and in Australia and the United States even more.

I tried to work out the reason for this differential. To a great extent it simply reflects the comparative lack of general mechanization in the Soviet Union, but this is not the whole story. There are ideological factors such as collectivism, whose direct application to beekeeping must, I think, be an effective deterrent to increase of efficiency. One application of collectivism to beekeeping, much favoured in East Germany just now, is the management of colonies by a ' brigade ' instead of by an individual. A brigade may consist of a brigade chief, a beekeeper and an assistant, who by working together have the benefit of collective activity. (Beekeepers in the west are so used to working alone, making decisions and acting on them a hundred times a day, that collectivism is unlikely to appeal to them.)

Another reason may be simply isolation from recent developments towards efficiency in countries outside the socialist bloc, which few Russians are allowed to visit. An attitude of mind oriented towards the full employment of everyone's time, rather than the best use of each individual's time, seemed to pervade everything I saw of Soviet life. In England we are fast following the Americans in questioning the time we spend on every operation, whether in working or in private life, and the attitude of mind this questioning induces becomes habitual. I therefore found it difficult to readjust myself to the time-consuming activities I saw all round me in the Soviet Union, and there seemed such obvious ways of speeding up some jobs and eliminating others. Russian shoppers queue three times for each purchase made in Moscow shops; telephone numbers and street addresses are obtained at manned information kiosks (directories and street plans do not seem to be generally available to the public); in hotels a woman is on duty continuously on each floor, handing out bedroom keys and keeping a general eye on things; in the trains each coach has a permanent conductor; and when one leaves the country, four consecutive officers examine one's passport in detail. Often it seemed to me that every action is checked by someone else, and that no decision can be made by an individual alone. In saying this I do not mean to criticize Soviet workers, but to put in perspective the apparently low efficiency of Soviet beekeeping: this must be viewed against a background of general overstaffing, which does, however, have the merit of maintaining full employment — not always a feature of the more ' efficient ' capitalist countries.

Honey yields

In the Soviet Union the average yield per colony may be quoted as the *surplus* honey extracted (10–12 kg., see page 53) or as the *total amount* of honey extracted, including that fed back to the bees (30–40 kg.). In most other countries honey is left on the colony for winter, not extracted and fed back, so the quoted colony yield is normally the surplus; care should therefore be taken in comparing Russian figures with others, to ensure that the ' yields ' compared are equivalent.

The surplus, 10–12 kg. or 22–26 lb. per colony, is about the same as thirty years ago (Professor Phillips quotes 22 lb. per colony); in the United States the long-term average has remained fairly constant at around 46 lb. for over forty years. Changes in farming methods in the U.S. have tended to reduce honey yields, which have been kept from dropping only

by improvement of beekeeping methods, and the same may well be true in the U.S.S.R. In any case, the yield varies enormously over such a vast area as the Soviet Union, which is two and a half times as large as the United States. The best honey-producing areas are far removed from Moscow, and some are known to few foreigners, even by name. Among them is the area bordering on the Pacific coast, known as the Far East; here the honey comes from wild plants and trees, especially limes. Primorskii and Khabarovsk are two of the centres. The southern part of central Siberia and the adjoining north-eastern part of Kazakhstan also contain rich honey-producing areas, and average yields may be around 100 kg. [220 lb.] per colony; figures for the Far East are 70–90 kg. Further west, both slopes of the Caucasus and the adjacent lower land give similar yields, obtained during a long active season. More modest harvests, but still good (around 50 kg.) are obtained in the republics between the Caspian Sea and Sinkiang, south of Siberia itself: Uzbekhistan (capital Tashkent), Kirghizstan, and southern Kazakhstan, where Alma-Ata is the centre of the great apple-growing area.

All the best beekeeping regions (except the northern Caucasus) are thus in Asiatic U.S.S.R. The best European regions are those just west of the Ural Mountains (Tatar, Bashkir, Chuvash, Mari and Udmort), the Ukraine, and the central Black Earth provinces, 200 miles south of Moscow. Murmansk and some other areas within the Arctic Circle also give high yields, because of the long foraging day at flowering time; the same is true in Alaska and the north of Sweden.

What happens to the honey produced? The beekeeper on a collective or state farm has no more responsibility for it after it is extracted and put into tins. These normally hold either 55 or 200 kg. [120 or 440 lb.], and are passed on to the appropriate government trading organization or co-operative for bottling and sale in the shops, which are also owned by the state. A state farm (*sovkhoz*) never sells honey in the normal sense of the word, but receives a payment which is 15% less than the amount for which the co-operative sells it.

The private beekeepers — who between them produce over 50 000 tons of honey a year, perhaps a third of the total crop — can dispose of their honey in several ways. If certain conditions are satisfied, they can sell it to the co-operatives (whence it also reaches the state-owned shops), or bottle *and label* it, and sell direct to the shops. Alternatively they sell it ' privately ', direct to neighbours or, more commonly, through the unofficial markets that exist in every town for the sale of agricultural produce resulting from private enterprise. Such honey is either sold loose, or in jars, but it must not be labelled, since labelling denotes sale through recognized government channels.

Honey on sale in the shops (all state-owned) is in glass jars holding 300 or 600 g. [10½ or 21 ounces]. Its price is regulated, and varies from place to place according to the supply of honey and other factors; for instance in Moscow it is at present 2.40 roubles per kg., and in Ufa further east 1.80 roubles per kg.* Sugar costs 0.90 roubles per kg. In the unofficial markets the price is regulated by finding out the price in the

*Equivalents in other currencies do not mean a great deal; at the official rate of exchange a rouble is about the same as a U.S. dollar, but this rating is far too high for many purposes. The pre-1961 rouble was worth a tenth of the present 'new' rouble.

(*continued on page 58*)

(*continued from page 57*)

nearest shop and charging slightly less; honey sold loose is of course cheaper than bottled honey.

In capitalist countries selling is a seriously studied science and art, and those with produce to sell actively *want* to sell it. The appearance of products is therefore made as attractive as possible, even — some believe — at the expense of quality. Honey may be filter-pressed for sale in supermarkets, so that it can compete on the shelves with clear syrups. In the shops of the Soviet Union, little or no attention is paid to making people want to buy, and there is thus no point in clarifying honey even to the extent of removing all the wax. This simplifies honey processing, and leaves the honey in a more ' natural ' state.

Types of honeybee

It was clear to me on my visit that the Soviet Union has a greater variety of useful material for bee breeding than any other country in the world. Indigenous bees of the north or central European race (*A. m. mellifera*) occur over a wide range of latitude and altitude. There is for instance a dark forest bee; the best known strain, especially noted for its hardiness, exists in Bashkir in the Urals (see page 57) where a reserve is closed to other strains of honeybee, so that the indigenous strain is kept pure. On the steppes further south is the steppe bee, with more Italian-like characteristics. A second race, Caucasian (*A. m. caucasica*) also occurs in considerable variety, and is discussed in more detail on page 73. I had not realized until I visited Georgia that the concept of ' a Caucasian race ' or even of ' a grey mountain Caucasian race ' is a gross generalization.

A. mellifera did not spread naturally across Siberia; during the evolution and distribution of the honeybee northwards, *A. mellifera* was deflected west of the Himalayas, and so reached Europe and western Asia. Meanwhile *A. indica* (*cerana*) was deflected east and spread up eastern Asia, through China to Korea, Japan, and what is now the Soviet Far East. There, in the forests of Primorskii, Soviet beekeepers have a second indigenous *species* of honeybee. European honeybees have also been introduced there, and it is these that give the high yields referred to on page 57.

A great deal of work is done on hybridization for honey-producing colonies, and on ' acclimatizing ' bees of one strain to areas where they are not indigenous. The effect of rearing one strain in colonies of another is being studied more in the Soviet Union than elsewhere; the idea of breeding a distinct strain of larger bees by repeated rearing in cells larger than normal is also creating much interest (page 60): both these studies have a sound ideological basis from the communist point of view. I heard less about bee breeding in the orthodox sense, which is given more prominence in capitalist countries. In Georgia the emphasis seemed to be on queen *rearing* rather than *breeding*. It may be that there are enough satisfactory indigenous strains in the Soviet Union, and that it is necessary only to conserve and distribute them; I do not know enough about them to say. But a wealth of material is certainly available for extensive breeding programmes.

SOVIET BEE RESEARCH

In the Soviet Union the emphasis is on beekeeping research rather than on bee research and, since beekeeping is part of agriculture, this

research comes under the Ministry of Agriculture. Effort is concentrated on *practical* as opposed to *theoretical* research; these are what we call *applied* and *fundamental* research respectively. Theoretical research, which comes under the Academy of Sciences, is dealt with on page 61.

The research effort differs from that in some capitalist countries in several ways. It is conceived on a very broad basis, covering not only research itself, but also teaching, and the issue of instructional publications: a piece of research is not finished with until its results have been put into practice in the collective and state farm apiaries. Secondly, it is closely unified, with a hierarchy of institutes, stations and laboratories with a clearly defined relationship to each other, an experimental station for instance ranking lower than an institute. At the head of the hierarchy is the Beekeeping Research Institute itself, where we spent a day after the meetings in Moscow.

The Beekeeping Research Institute

This is now situated in a new building (Fig. 5) at Rybnoe, near Ryazan, a provincial capital 120 miles south-east of Moscow, with a railway junction where trains for Tashkent in Uzbekistan separate from those going on for twelve days and nights to Vladivostok on the Pacific coast. The Institute moved here from Moscow in 1955; it had been founded in Tula in 1930. It has by far the largest personnel of any beekeeping institute in the world, made up as follows*:

Department	*Head*	*Scientific staff*	*Other staff*	*Total*
Administration	N. M. Glushkov (Director)	3	5	8
Bee management	G. F. Taranov	12	12	24
Economics and organization	A. M. Kovalev	5	1	6
Construction (equipment)	G. F. Bukharev	5	4	9
Disease control	S. S. Nazarov	6	5	11
Technology of bee products	N. N. Silitskaya	3	3	6
Royal jelly	L. N. Braines	4	3	7
Pollination of agricultural crops	K. P. Istomina-Tsvetkova	3	2	5
Bee forage	G. V. Kopel'kievskii	7	3	10
Propaganda	F. S. Battalov	4	2	6
Library	A. Komorovskaya	1	—	1
Museum	S. A. Rozov	1	—	1
Postgraduate students		6	—	6
Typists		—	5	5
Maintenance		—	4	4
Drivers		—	3	3
Guards		—	5	5
Cleaners		—	3	3
		60	60	120

* In Russian, women's names end in the letter *a*.

During my stay in the Soviet Union, and during a return visit he paid to England this spring, I got to know Nicolai Mikhailovich Glushkov, the Director, quite well, in spite of our having no language in common[2]. I think that his ability as a teacher and an administrator has been important in the evolution of the Institute with the beekeepers themselves so much in mind. The aim and purpose of the Institute is to develop the beekeeping sector of agriculture in the Soviet Union, and its large staff appears singularly wholehearted in its efforts to do this.

The largest department is that on bee management, which has subsections on bee physiology (especially nutrition and wintering), bee breeding and zootechnics; the last two are especially concerned with fixing stable 'race groups' from north-Russian/Caucasian hybrids, and from bees reared in large cells; this last is Mr. Glushkov's own special interest. The economic aspects of bee management are dealt with in Mr. Kovalev's department; these include colony distribution, payment to beekeepers, and new systems of production (e.g. one beekeeper running several apiaries). The five scientists and their assistants in the Construction department are busy with the design of hives, extractors and other equipment; the future mechanization of Soviet beekeeping would be in their hands. Each of the major bee diseases has its own specialist in Mr. Nazarov's department; for example N. I. Smirnova, working on foul brood, is studying bacteriophages. The examination of infected bees and combs is referred to the department by the local disease inspection services only where there are special difficulties; 3000 such diagnoses are carried out in a year, and extra workers are appointed for the summer months.

Bee products are studied in two departments; the first is concerned mainly with honey; samples are analysed, and standards are being worked out. A separate department with a staff of seven has recently been established to work on the physiological properties of royal jelly, in conjunction with the medical profession. Lyophilized royal jelly is sold under the name Apilac, and 56 kg. were produced in 1962. Special interest is shown in this department at the moment, and comparatively less work is directed to other bee products.

The next two departments deal with bees in relation to plants. That under K. P. Istomina-Tsvetkova (Mrs. Trubetskoi), which again has extra workers in the summer, has charge of evaluating the requirements of various agricultural crops for bee pollination, and the best ways of getting them pollinated. (The technique of training bees to visit crops by feeding the colonies with scented syrup seems to be losing its popularity as more difficulties and limitations are brought to light.) Most of the work is done in the field, in collective or state farms in suitable areas; this collaboration with the farms themselves is a feature of much of the work in other departments, too: the Russian scientist always has his feet well on the ground. Mr. Kopel'kievskii's department deals with the improvement of nectar and pollen production from both wild and cultivated plants; it has an extensive arboretum and trial ground for herbaceous plants.

A full-size Propaganda department is not commonly found in beekeeping research institutes, but the Russian use of the word propaganda is not pejorative as ours often is; it has the literal meaning of 'an organized scheme for the propagation of a doctrine or practice' [O.E.D.]—in this case better beekeeping. When I saw what this department did, I began to think that our institutes might well incorporate them too. Its function is to get over to the beekeeper what the research workers have found out — and what the research workers seek to find out is what will affect beekeeping visibly, directly, and as rapidly as possible. The staff of this department write books, leaflets and newspaper articles, make films and slides, give demonstrations and lectures, run correspondence courses, and provide an exhibition van. The Institute conducts large-scale experiments, in which the beekeepers of collective and state farms take part, and these are also organized from the department, as are the full-time courses on

beekeeping held at the Institute. Mr. Rozov, in charge of this work, has retired since my visit, but he still runs the museum, where I was astonished to see many items still preserved, through the Revolution and two world wars, from the Tsarist Beekeeping Museum founded in the 1880s; here, for instance, was one of Prokopovich's hives.

The library of the Institute is well served by Miss Komorovskaya, who reads and speaks both English and French fluently. This is perhaps a suitable place to put on record my great debt to her, and to Mrs. Trubetskoi of the Pollination department, for their indefatigable translation between Russian and English. Both had learned English as children; neither had spoken it for twenty years or more, but for hours on end they translated most competently for my benefit.

It is often said that the Russians tend to live in the future: as well as a museum, the Institute has a large diorama showing itself as it will one day be. The present thousand hives have become three thousand, new laboratories are built (those for royal jelly and plant physiology are already going up), and neighbouring woods provide more and better bee forage. The Institute already has several blocks of flats for its workers, and is itself (for ideological reasons) part of a collective farm of 500 hectares [1200 acres], which employs a further seventy workers. It receives a government grant of 250 000 roubles*, and makes perhaps as much again from such sources as the sale of farm and beekeeping produce, and fees paid by farms for investigations done specifically for their benefit.

Other bee research establishments

The ' independent ' republics of the Ukraine, Kazakhstan, Georgia and Armenia, and the ' autonomous ' republics of Orlov and Bashkir, have their own beekeeping research stations. The Institute itself owns beekeeping experimental stations in Kemerovo, Tatar and the Far East. Various agricultural and horticultural institutes have beekeeping departments where ' practical ' research is done. Altogether, at least 56 institutions carry out beekeeping research in conjunction with the Institute.

Research in the universities and in certain other institutes comes under the direction of the Academy of Sciences, a body which has the direction and control of academic research in a way unknown to our Royal Society or the U.S. National Academy of Sciences. Here the research is more ' theoretical ' (fundamental), and results are more commonly subjected to statistical analysis than those obtained elsewhere (see page 62).

Research work on bees is done by Lavrekhin and Smaragdova at Moscow State University — a thirty-storey building in Stalinist style — and by Mel'nichenko at Gor'kii State University. Poltev and Zhdanov are at the veterinary institutes at Novosibirsk (Siberia) and Kazan respectively, and Avetisyan at the Timiryazev Academy of Agricultural Sciences in Moscow. One of the Congress visits was to this Academy, and I still regret the fact that by the time it was due, the strenuous programme had temporarily defeated me, and I spent the time asleep instead.

Soviet research publications

Russian reports on research work are studied eagerly in other countries, but they puzzle and disappoint many who try to use them, because of their style of presentation. I was concerned to find out what lay behind this

* See footnote on page 57

feature, because I knew that it prevented a proper appreciation of Soviet research in capitalist countries.

UNESCO[6] has recently offered some definitions of scientific publications, which have now been adopted by the International Council of Scientific Unions. Publications reporting original research work are classified as:

(1) original scientific papers, written in such a way that a qualified research worker, specializing in the same branch of science, is able, simply on the basis of the information given:
(*a*) to reproduce the experiments and secure the results described with equal accuracy or within the limits of experimental error specified by the author; or (*b*) to repeat the author's observations and judge his findings; or (*c*) to check the accuracy of the analyses and deductions on which the author's findings are based.
(2) provisional communications or preliminary notes, containing one or more novel items of scientific information, but insufficiently detailed to allow readers to check the information in the ways described under (1).

Some research papers published from universities and other establishments under the Academy of Sciences are in category (1) above, but comparatively few from institutes and experimental stations under Ministry of Agriculture — where most of the research on bees and beekeeping is done. As far as I could make out, there are two main reasons for this.

One reason is bound up with the great rapidity of scientific and technical expansion: development that has taken a century in western Europe has been concentrated into decades in Soviet Russia. There, they have—as they constantly say—' so much to do ' to develop their country's resources — or, as some would put it, to catch up with the more highly developed foreign countries. This was true of North America in the last century, and is true to a much greater degree today of the emergent countries of Africa and Asia. Everywhere I went in Russia I got a vivid impression of development and expansion, and of a communal sense of responsibility in working to these ends. Some of the scientists I questioned agreed in principle that full-scale investigations with adequate statistical analysis are desirable, but they pointed out that at present they have so many problems to tackle that they have no time to make more than quick, small-scale tests on some of them; later on there may be time to go into questions more thoroughly. In a country the size of the Soviet Union, being developed at the present rate, the application of results already known in principle brings far greater economic rewards than long-term experiments on a fundamental problem—that may in any case get solved elsewhere during the next few years.

Secondly, I have emphasized that Soviet research work is done specifically to be used, and that it is not considered finished with until it *is* being used. This, coupled with the significance attached to the institute or office as opposed to the individual, and the custom of referring to an appropriate higher authority instead of accepting individual responsibility, affects the *presentation* of Soviet research work. In capitalist countries, primary research papers are written with other individual specialist scientists in mind, who are accounted both judges and users of the papers. But in the Soviet Union, research work is highly unified, and

the only recognized judge may be the authority under which the scientist works; the chief user is the beekeeper himself. This may help to explain why many primary Soviet research papers are didactic, and lack experimental details — beekeepers do not need them. But their absence often leads foreign scientists to reject such papers on the grounds of insufficient evidence.

Soviet research work often appears to give more clear-cut answers than that from western countries, but this too is largely due to difference between the approved styles of writing. Once, for a reason I have now forgotten, I asked a linguist to put into English a Russian translation of an English research paper. The difference between the two English versions was striking: the doubts and uncertainties in the original had disappeared in the other. ' The explanation may be that . . .', ' In certain circumstances it is true that . . .', had become clear-cut statements, without any of the caution and admissions of doubt that characterize the writings of western scientists, directed at similar specialists and not intended to serve as instructional material.

The translating, abstracting, and library services of the Soviet Union are good, and unified in a way that should help to prevent duplication of effort. I was able to visit the Central Agricultural Exchange Library in Moscow, and to discuss ways of increasing the mutual help between the Library and the Bee Research Association. I was touched by the warm welcome I received from the staff there; perhaps they do not have many foreign visitors, but in any case it was clear how much they want foreign scientific publications, and how difficult it is for them to get even a fraction of what they could use. This difficulty is due almost entirely to the severe restriction on foreign currency allowed for scientific books and journals. Almost every scientist I spoke to in the Soviet Union wanted more foreign contacts in this way. The Bee Research Association publications seem to be very much valued— ' they tell us what is going on in the outside world ' — and all seem to be translated in full into Russian. But currency is allowed for say a dozen copies instead of the hundreds that are wanted.

Mrs. Bogdanova, one of the translators at this Library, is another whom I must especially thank for her hard work on my behalf. I hope that she herself gained a little useful practice; although she is a professional English-Russian translator, I was the first ' native ' with whom she had spoken English.

GEORGIA

Our visit to Georgia (Gruzinia is the Russian name) was as unalloyed pleasure to me. The sight of the long range of the Caucasus mountains from the air, as we approached from the north, was a relief after the seemingly endless east-European plain — it was like the first sight of the Rockies after crossing the Middle West. To Russians who have spent their lives as plain-dwellers, mountainous country can seem remote and forbidding; one of my Russian companions dismissed the scene as ' Nature in her savage mood '. But it was the type of country that I knew and loved, with wooded foothills and sheltered valleys and, standing high above all — like the string of volcanic peaks of the Cascade Range along the Pacific coast of North America — was Mount Elbruz, 18 526 feet high

and the highest point of Europe. This range of mountains was the refuge of honeybees during part of the Ice Age period, and here the varieties of the Caucasian race evolved.

In another way, too, I was approaching familiar country. In classical times the Caucasus mountains were the northern border of the known world, and we were entering a region which formed the background of stories familiar to me since childhood. Here in the Caucasus, Prometheus was chained; to the south, where we were heading, was the Rion valley where Jason sought and found the Golden Fleece. And I knew that up the valley, over the watershed between the Black Sea and the Caspian, was Tbilisi (Tiflis), where fourth-century churches still stand as memorials to Georgia's importance in early Christian history. (Georgia shares with England her patron saint, St. George.)

We landed first just north of the Georgian border at Adler, in what used to be Circassia, famed for centuries for the beauty and docility of her maidens. In a smaller plane we flew low along the Black Sea coast to Sukhumi, and I could not help wondering just where along this coast Jason and his Argonauts had landed. The Greek city Dioscuria is now beneath the sea, and Sukhumi contains no traces of it; it was replaced by Sevastopolis, then by Tskhumi; in the sixteenth century the Turks built a fortress called Sukhum-Kaleh — hence the present name.

Modern Sukhumi is one of the Black Sea resorts, in a lovely position with the snow-capped peaks and wooded foothills of the Caucasus for a backdrop. Here the staff of the Beekeeping Department of the Georgian Experimental Station at Tbilisi had come to meet us, since a congress on wine-growing in Tbilisi prevented our making that town our headquarters. Our welcome at the airport (Fig. 9) was a fair introduction to the hospitality to come. In both Russia and Georgia bouquets are presented to men and women alike; here some of the species were new to me, for we were in Asia. As we drove from the airport to the town, the hard blue sky and palm-lined roads, and even the buildings beside them, reminded me forcibly of Cuba. My companions were interested when I told them this, but I had to disappoint them by admitting that I had only visited the island ' before the revolution '.

There was a great loosening of restraint in Georgia: clothes were less formal, voices seemed louder, and laughter and song were easily provoked. The food was more varied — and hot in the Mexican sense — and the light Georgian wines added to the general feeling of well-being. By day the sea was brilliant blue, but by night it was truly black, except for a path of silver beneath the full moon. We seemed worlds away from Moscow.

Beekeeping in Georgia

Even in early times Georgia was famous for its honey and beeswax. Strabo, however, complained of the bitterness of some of the honey from Colchis, the ancient country at the mouth of the Rion valley. (It was near Trebizond, 150 miles away across the Black Sea, that Xenophon's soldiers were poisoned by rhododendron honey.) Sukhumi is in Abkhazia, now an ' autonomous ' republic of Georgia, but formerly part of Circassia. A hundred years ago the Circassians still worshipped Merissa, protectress of the bees. They said that once all the bees were destroyed but one, which took refuge in Merissa's sleeve, and that this bee was the ancestor of all the bees that followed[1].

By the nineteenth century there were large apiaries in Georgia, and vodka was made from some of the honey. In 1910 there were 50 000 colonies, and these have now been increased to 250 000. At a formal meeting in the drama theatre, and elsewhere, we heard about present-day Georgian beekeeping from the staff of the Beekeeping Research Station: Director Mateshvili, and Michael Lekashvili, Zurab Makashvili, George Mchedlishvili, Maria Mrevlishvili . . . Almost all the Georgians I met had names ending with *shvili*, which presumably means ' son of '. Georgians speak Russian as well as their native language, which has affinities to few others, and does not belong to the Indo-European group; an example is shown in Fig. 14. The Georgian peoples are not Slavs.

The Station has a staff of forty, in four departments: beekeeping organization and technique, bee diseases, bee breeding, and bee forage. And Georgia is half the size of England and Wales, with a tenth the population; it has about the same number of colonies of bees. One of the chief aims of the station is to train beekeepers in the best use of their indigenous Caucasian bees. There are three chief strains of these, in Abkhazia, Mingrelia, and Svanetsia in the higher mountains. In Krasnodar on the *northern* slopes of the Caucasus there are other mountain strains, and in the plain of Azerbaijan, between Georgia and the Caspian Sea, there are yellow ' Caucasians' which are not a mountain strain, and which seem to be more like Italians. All these belong to the Caucasian race. One of their characteristics is their great tongue length, which varies from strain to strain and is greatest of all in Svanetsian bees. Georgian bees are said to be easily acclimatized in other regions; their other characteristic — docility — I could see for myself in the apiaries we visited.

The first of these (Figs. 10, 11, 14) belonged to Il'ich State Farm in the coastal plain; it was an example of the 60 000 apiaries on the Soviet collective and state farms (page 53). We had a terrific welcome, and the beekeeper opened various hives for us (Figs. 11, 14), so that we could see Abkhazian bees on their own home ground. I was amazed at their complete docility, and the way in which they remained on the combs as these were removed from the hive, photographed, and generally handled. No propolis was visible, but I learned on enquiry that the frames had recently been cleaned up. We were finally called to a table in the open, laden with fruit and wine, and here Mr. Aiba, Deputy Minister of Agriculture for Abkhazia, presented me with a comb of honey from the apiary weighing 7½ pounds. We were given as many pears and bunches of grapes as we could carry away, and two very happy and merry bus loads returned to Sukhumi, full-throated Georgian songs speeding us on our way.

The other apiary was up a sheltered valley in the foothills, beyond a bridge built in Queen Tamara's time. It was part of the Sukhumi State Queen-rearing Apiary, under the Ministry of Agriculture. The Apiary has a staff of 22, consisting of four chiefs, and six brigades of three each (see page 56). Each brigade can manage 250 colonies; it has 10 rearing colonies, 1 or 2 drone colonies, and 150 mating nuclei (Figs. 12, 13). Colonies are migrated fifty miles into the mountains in the spring, where various flows can be obtained at different heights until September. The average honey surplus is 25 kg. per colony, largely from Spanish chestnut and lime (*Castanea sativa* and *Tilia parvifolia*).

The Apiary has expanded from 180 colonies in 1950 to 1200 in 1962, queen production rising from 250 to 4080; there is considerable pride

that queens are now exported to Cuba. Packages have increased from 50 in 1954 to 560; a package here is what we would call a nucleus — several combs with queen, bees and stores. To give ventilation during transport, these are dispatched in a wooden box large enough to make about six American package-bee boxes.

I was impressed with the beekeeping potential in Georgia. In Texas I had once watched the loading up of a single consignment of 1500 packages from the Weaver Apiaries, each with queen, bees and stores, to be driven 2000 miles to Minnesota in one truck. Here in Georgia they have good bee country, and good bees, which seem still to be sufficiently homogeneous within the different regions to make special breeding unnecessary. The range of latitude is about the same in the Soviet Union as in North America, where in recent years some 500 tons of package bees have been produced annually — approaching half a million packages. There would seem to be no reason why production should not be developed on a similar scale in the Soviet Union, as and when adequate roads and transport vehicles are built, and beekeeping operations can be speeded up to absorb less manpower.

Georgian hospitality

We were finally taken into the honey house, where another Georgian spread was laid out; cold meats and fish and the local salty cheese, flat bread-cakes called *lavash*, and towering dishes of fruit. The wine was in traditional decanters and glasses, of a beautiful Bristol blue. There were speeches and songs, and we felt immersed in Georgian hospitality and friendship. When we finally left, we found an overflow party on the hillside among the hives (Fig. 15). Here a barrel of wine was fitted with an outlet tube, but no stopper; it was just kept moving from glass to glass. When the time came to leave the apiary, we found the gate closed against us ' in the Georgian tradition ': guests were let through singly as they drank a final glass. One of the Hungarian delegates, Dr. Orösi-Pál, did not drink wine at all; he managed his numerous toasts very well by starting off ' With an empty glass but with a full heart . . . ' But this did not help him here, and he led an escape party through a bramble hedge, where persimmons and pomegranates grew. On the bus ride back to Sukhumi there was dancing as well as singing: in their singing the Georgians reminded me of a Welsh choir.

Throughout their history — which is much longer than that of the Russians — the various races of Georgia have been noted for their bravery, hospitality, musical ability and good looks. The first quality I was not in a position to test, but I can certainly confirm the continued existence of the other three.

We were given a final banquet that evening; in both Russia and Georgia speeches go on all through the meal, and mine usually came early, since Anglia took precedence alphabetically over even Bulgaria. We were presented with drinking horns, but were told that those used traditionally by Georgians were much larger, and that having no stand they could not be set down until they were emptied. On our way to the airport next morning we were also given some of the tea grown in Georgia — which is outstandingly good.

We were all unwilling to leave Georgia. I badly wanted to go to Tbilisi with the staff of the Beekeeping Station, but such individual

deviations from collective life are unthinkable in any of the republics of the Soviet Union, and I can only hope that one day, in some way, I shall be able to enjoy the hospitality of Georgia again, and see more of its mountains and its beekeeping.

OTHER ASPECTS OF RUSSIAN LIFE

Time and opportunity were also made for activities unconnected with beekeeping. At the Bolshoi Theatre, Congress delegates and guests watched a magnificent performance of Gounod's *Faust*, with the *Walpurgisnacht* as pure ballet. This was superb: most of the dancers were very young, and their movements were so light, and had such grace and beauty, that they provided a striking contrast to the everyday Moscow scene (Fig. 16).

We also visited the Kremlin (the Russian word *kreml* signifies a fortress or citadel, and most of the older towns are built round the original fortified enclosure or *kreml*). The Moscow Kremlin covers 65 acres, on which Parliament buildings and Party headquarters now stand cheek by jowl with the palaces, bell towers, cathedrals and churches built by the earlier rulers of Russia. All is now cheerful, and full of organized groups of tourists, but there must be many Russians to whom the Kremlin still symbolizes the fear and tyranny of an earlier era.

Moscow's Kremlin was founded in the twelfth century, when the first (wooden) walls were raised round the defence position afforded by a low hill above the Moskva river. Records tell us that during the next century a modest trade developed in local produce such as honey, beeswax, hemp and grain.

Thanks to the kindness and forethought of various individuals, I was also able to pay several visits which had nothing to do with the Congress programme. In Red Square itself there was St. Basil's cathedral, built by Ivan the Terrible in 1550 to commemorate his victory over the Kazan Tatars (Fig. 17), which has been called the most fantastic and astonishing of all earthly churches. It is not now an 'acting' church, i.e. used for worship, nor is the old Andronivev Monastery to the east of Moscow, where I was enchanted with the frescoes and icons of Rublev (1360-1430). But at Sergiyevo, now Zagorsk, forty miles from Moscow along the Archangel road, is the famous Trinity (Troitsa) Monastery, restored to use by the monks when the prohibition of public worship was recently ended (Fig. 18). Here Ivan and Anastasia had journeyed on foot from Moscow through the snow and ice of the 1546-47 winter, on a devotional pilgrimage that constituted their honeymoon. The silver tomb of Saint Sergius is still an object of great veneration to Christian Russians: the little church was packed, with a congregation which followed the service with an intensity of feeling I had never experienced anywhere. Their strange eastern chanting seemed to express the anguish of the ages for the church in persecution and the long-forbidden worship of God.

ACKNOWLEDGEMENT

I cannot finish this account without thanking, both individually and collectively, all those who showed me kindness and hospitality in the Soviet Union. I know that some of my 'capitalist' ways must have been a trial to them, especially my inability to act, think, and behave collectively,

and I am most indebted to them. They enabled me to see something of the bees and beekeeping of a country which owns a quarter of the world's hives, and at the same time to get a glimpse of a *human* socialist system at work.

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